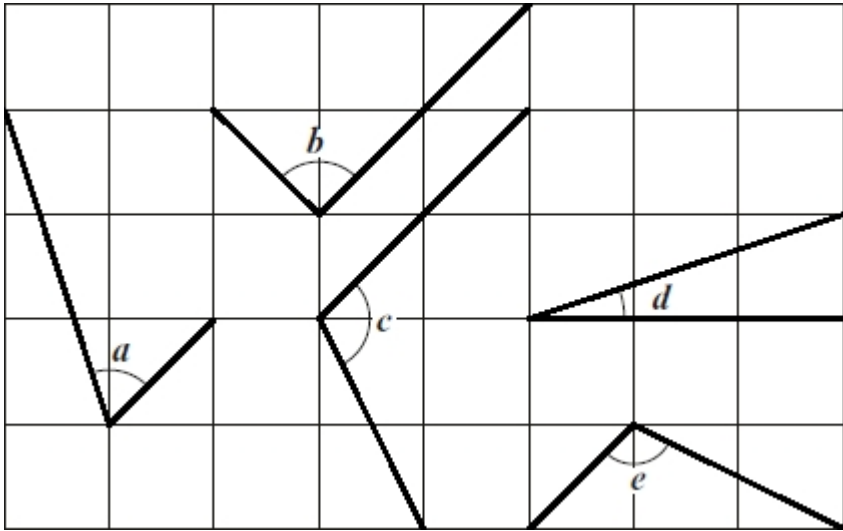


1.

Here are five angles marked on a grid of squares.



Write the letters of the angles that are **obtuse**.

\_\_\_\_\_

1 mark

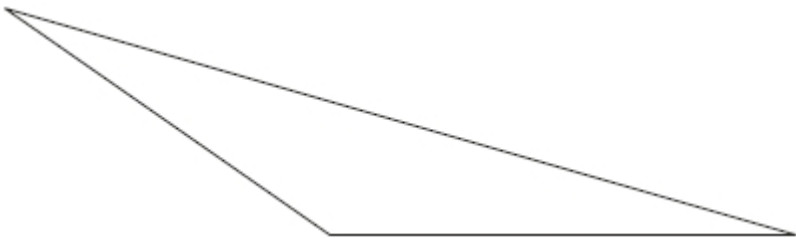
Write the letters of the angles that are **acute**.

\_\_\_\_\_

1 mark

2.

Here is a triangle.



Measure the shortest side accurately, in centimetres.

1 mark

Measure the largest angle.



1 mark

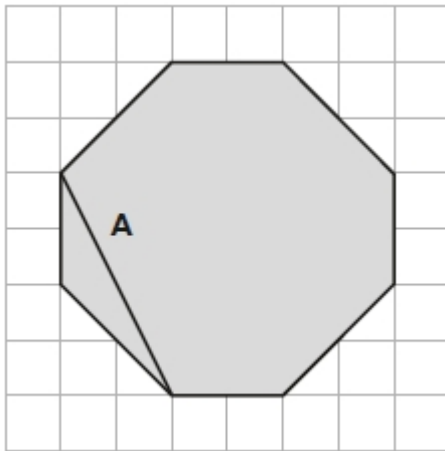
3.

The diagram shows a shaded octagon on a square grid.

Line **A** joins two vertices of the octagon.

Join two other vertices to draw a line **parallel** to line **A**.

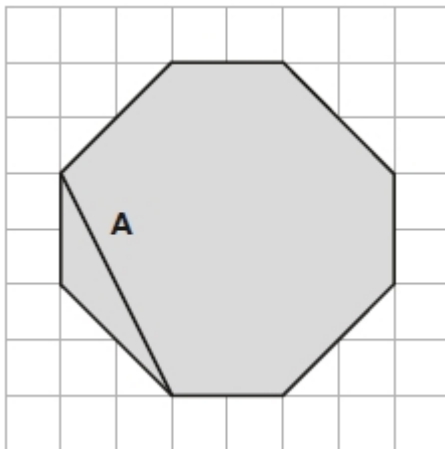
Use a ruler.



1 mark

Join two vertices to draw a line **perpendicular** to line **A**.

Use a ruler.

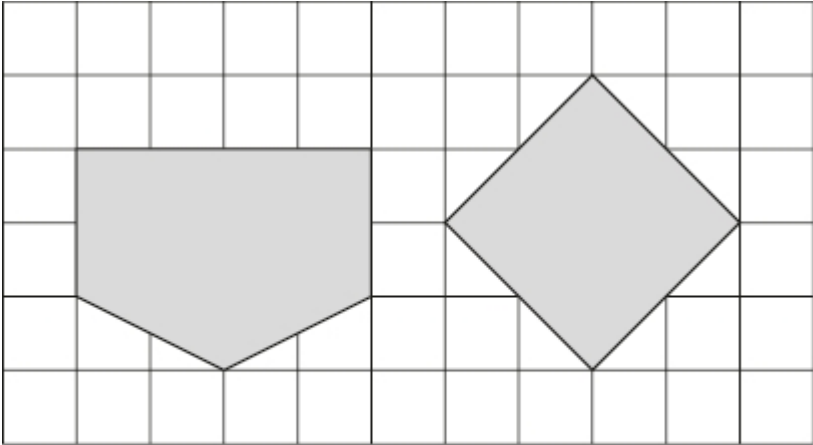


1 mark

4.

Here are two shapes on a square grid.

For each shape, write how many **right angles** it has.

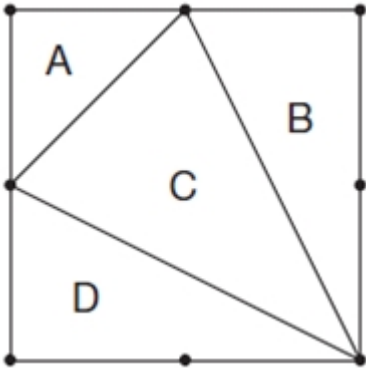


1 mark

5.

This diagram shows a square with dots at the vertices and at the middle of each side.

The square is divided into four triangles, **A**, **B**, **C** and **D**.



Write the letters of all the triangles that have a **right angle**.

---

1 mark

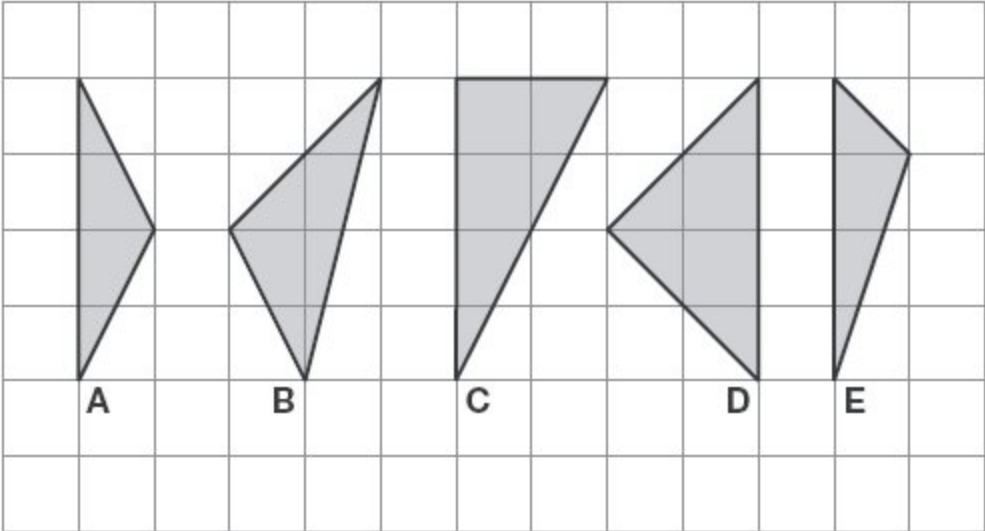
Write the letters of all the triangles that have **two equal sides**.

---

1 mark

6.

Here are five shaded triangles on a square grid.



Write the letter of each triangle that has a **right angle**.

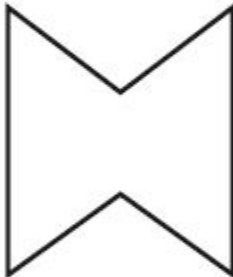
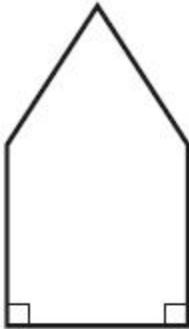
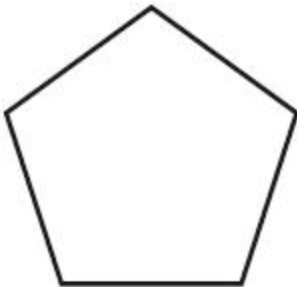
1 mark

Write the letter of each triangle that has **two equal sides**.

1 mark

7.

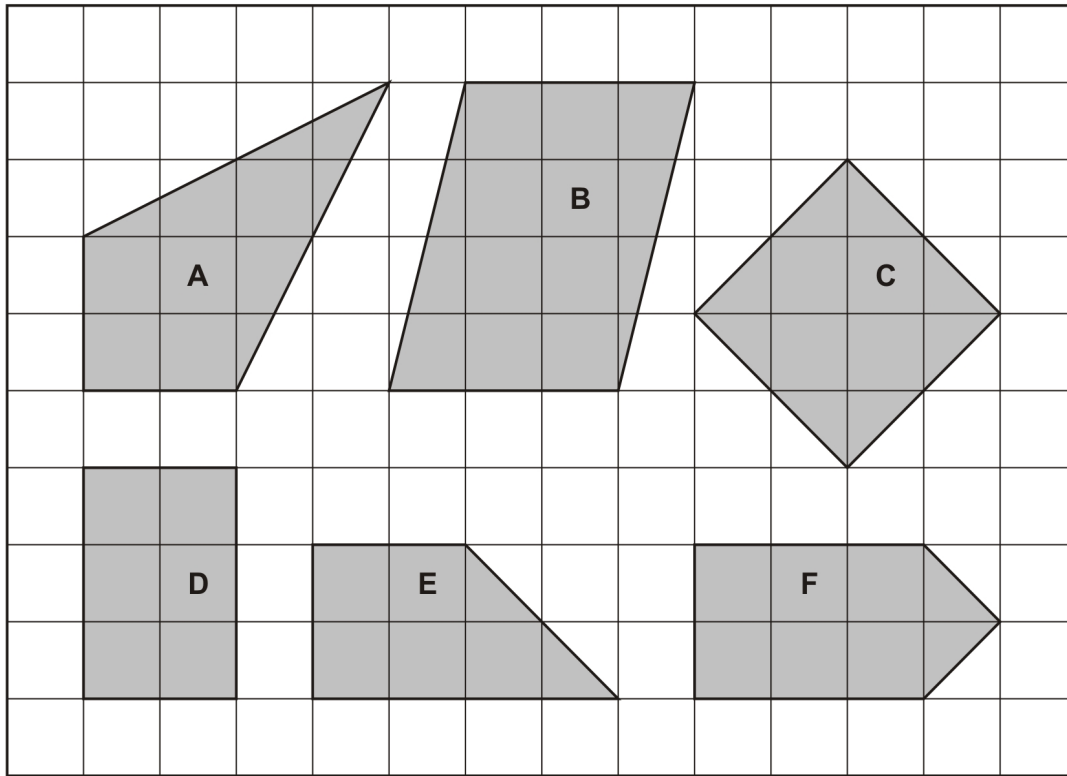
Circle the **pentagon** with exactly **four acute angles**.



1 mark

8.

Look at these shapes.



Complete the sentences below.

One has been done for you.

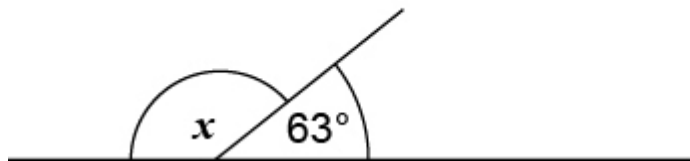
- \_\_\_\_\_ **A** \_\_\_\_\_ is a kite
- \_\_\_\_\_ is not a quadrilateral
- \_\_\_\_\_ has only 2 right angles
- \_\_\_\_\_ has 2 acute angles

2 marks

9. Calculate the size of angle  $x$  in the diagram.

Do not use a protractor (angle measurer).

not drawn accurately



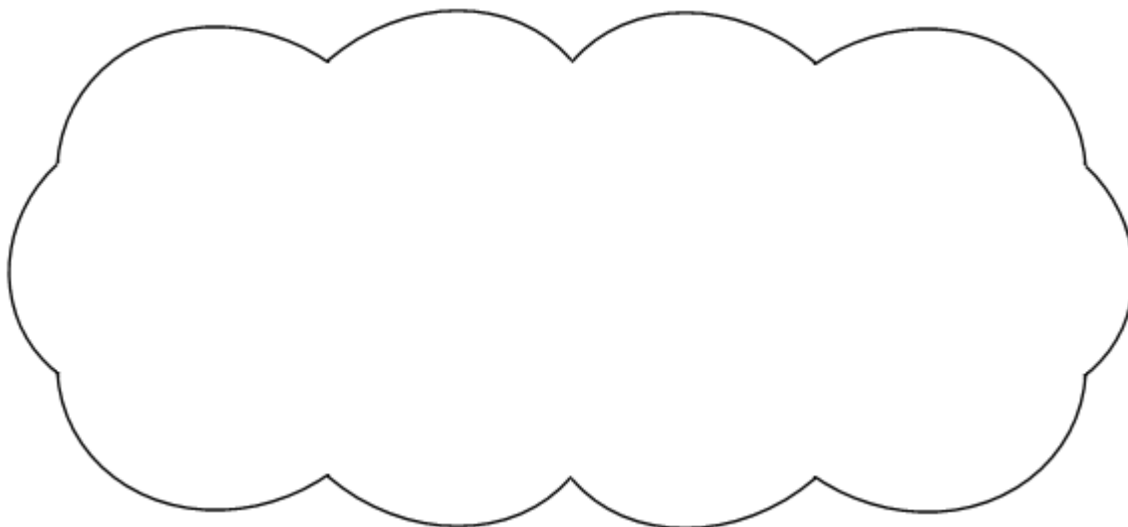
1 mark

10. Two of the angles in a triangle are  $70^\circ$  and  $40^\circ$

Jack says,



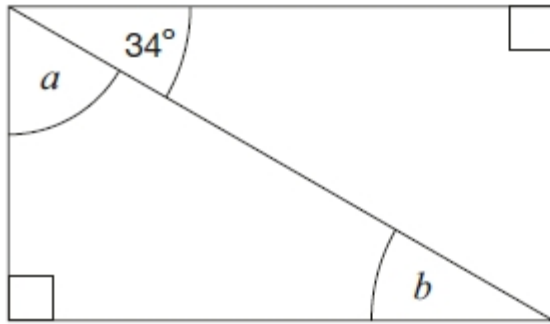
Explain why Jack is **not** correct.



1 mark

11.

Here is a rectangle.



Not to  
scale

Calculate the size of angles  $a$  and  $b$ .

Do **not** measure the angles.

$a =$

1 mark

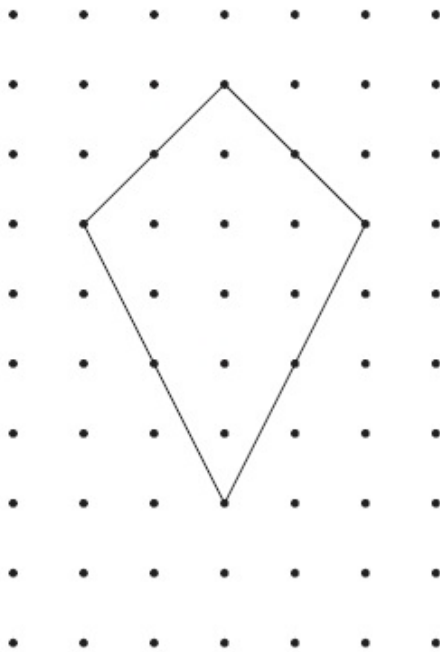
$b =$

1 mark



12.

Here is a shape on a grid.



For each statement, put a tick (✓) if it is true.

Put a cross (X) if it is not true.

The shape is a quadrilateral.

The shape has 2 lines of symmetry.

The shape is a parallelogram.

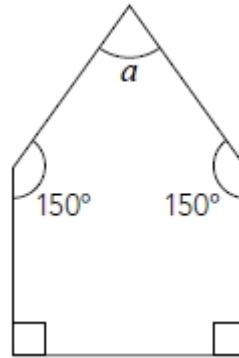
The shape has one right angle.

2 marks

13.

The diagram shows a pentagon.

Not drawn accurately



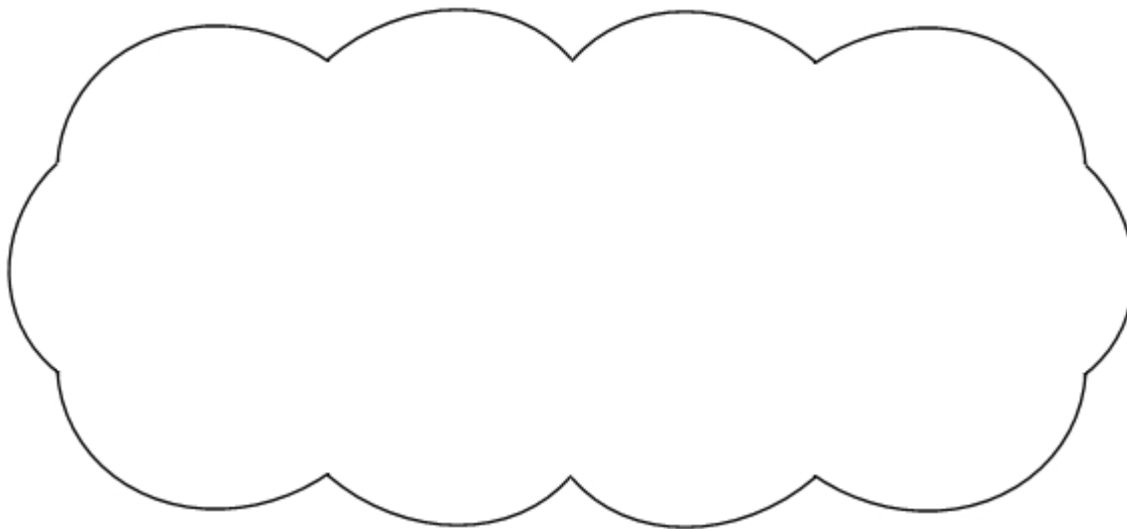
Each side of the pentagon is the **same length**.

Is the shape a **regular** pentagon?

Circle **Yes** or **No**.

Yes / No

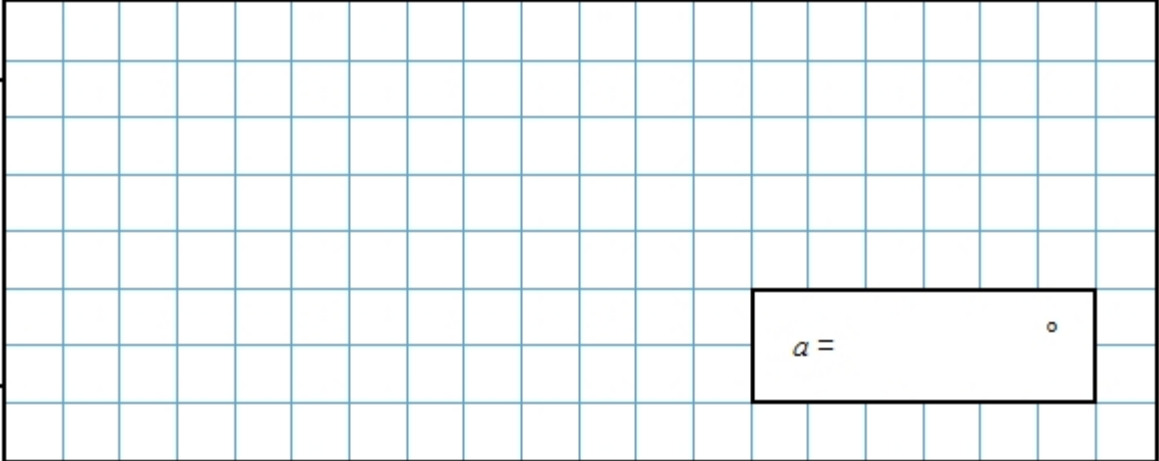
Explain your answer.



1 mark

Work out the size of angle  $a$

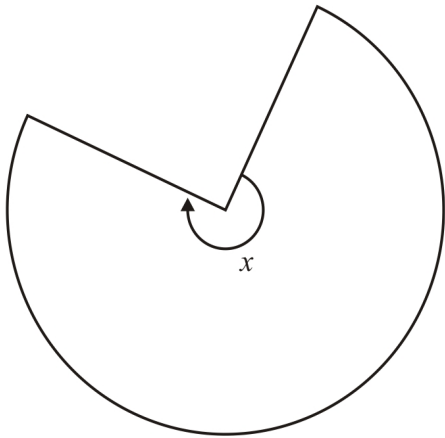
Show your method



$a =$

2 marks

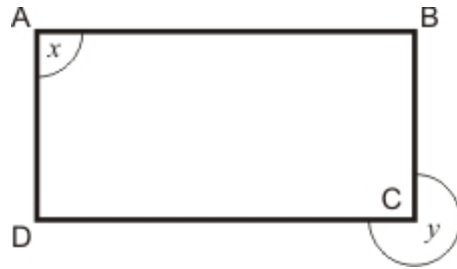
- 14.** This shape is **three-quarters of a circle**.



How many degrees is **angle  $x$** ?

1 mark

15. ABCD is a rectangle.



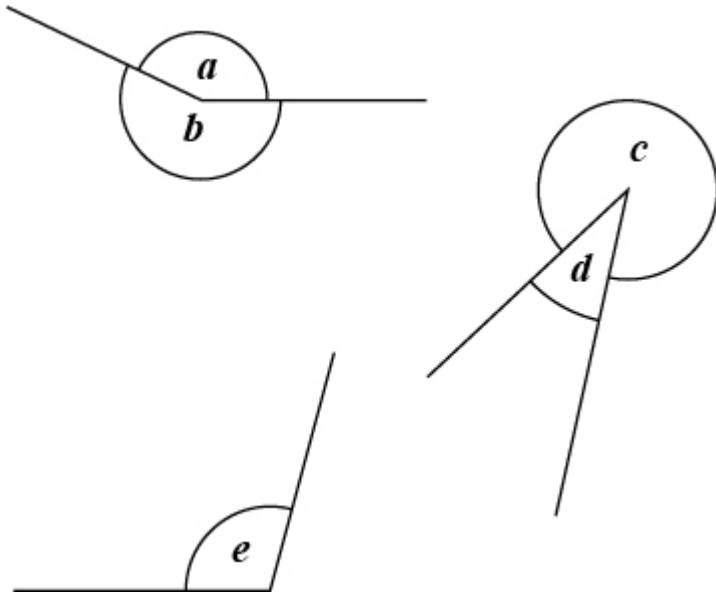
What are the values of the missing angles?

$x =$

$y =$

2 marks

16. Look at angles  $a$ ,  $b$ ,  $c$ ,  $d$  and  $e$



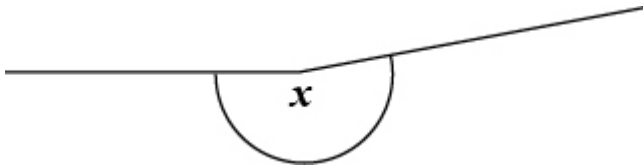
Write the angles in order of size, starting with the smallest.

smallest

1 mark

17.

Estimate the size of angle  $x$



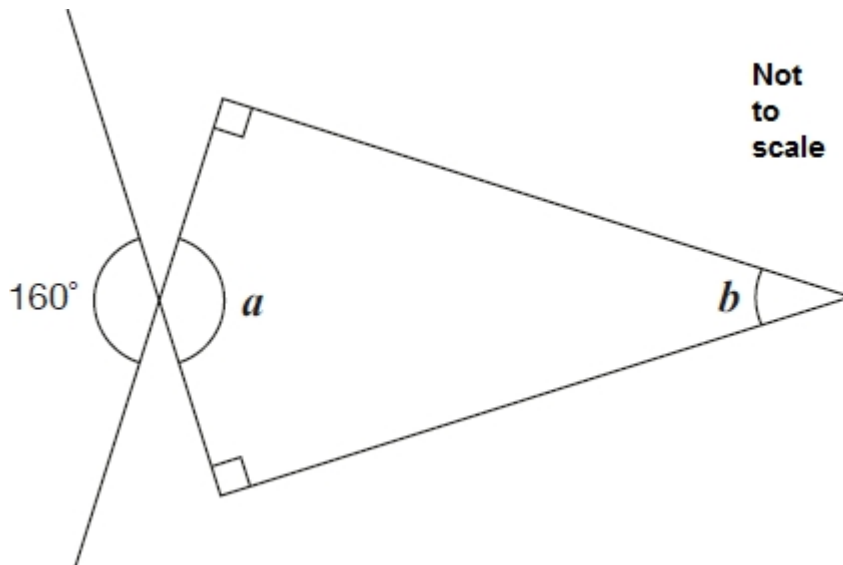
Circle the closest estimate.

170°    310°    190°    260°    180°

1 mark

18.

Calculate the size of angles  $a$  and  $b$  in this diagram.



$a =$

1 mark

$b =$

1 mark

**19.**

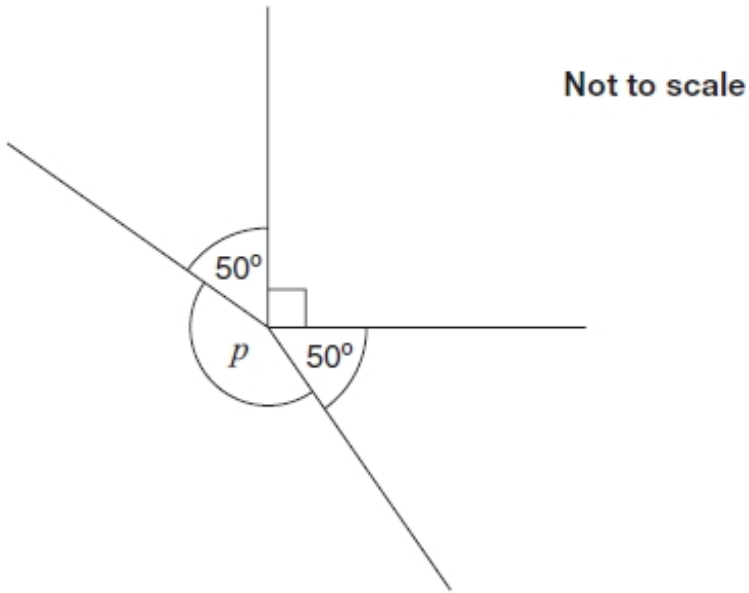
Anna has four **different** triangles.

Complete the table to show the size of the angles in each triangle.

Type of triangle	Angle 1	Angle 2	Angle 3
Isosceles	90°		
Right-angled	80°		
Isosceles	70°		
Isosceles	70°		

2 marks

20.



Calculate the size of angle  $p$  in the diagram.

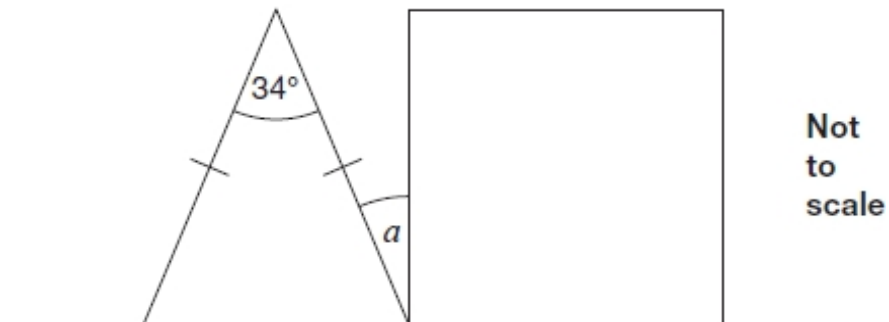
Do **not** use a protractor (angle measurer).

Show your method

2 marks

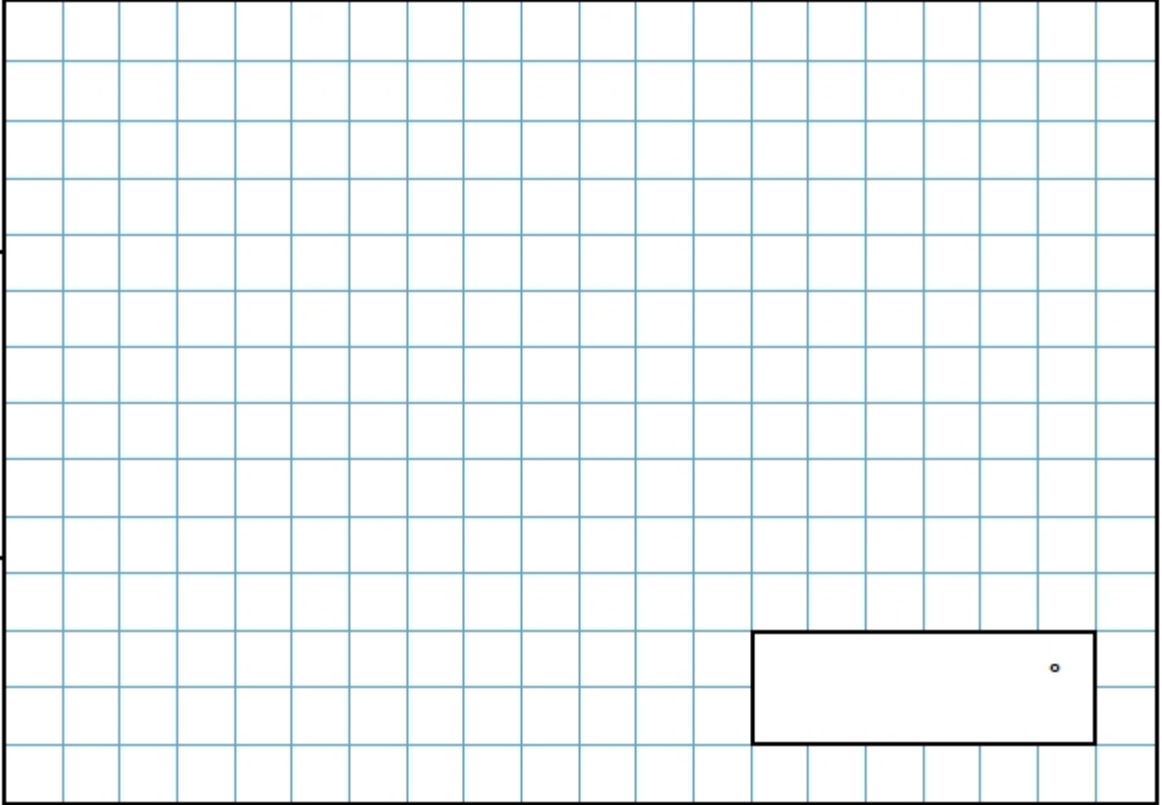
21.

The diagram shows an isosceles triangle and a square on a straight line.



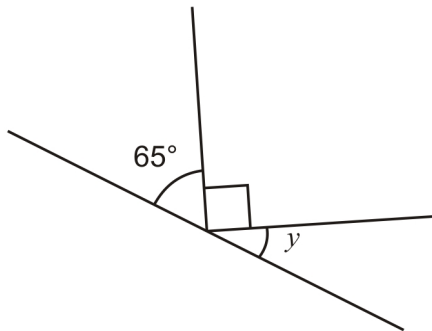
Calculate angle  $\alpha$ .

Show your method



2 marks

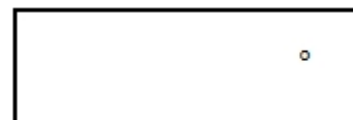
22.



Not to scale

Calculate the size of angle  $y$  in this diagram.

Do **not** use a protractor (angle measurer).



1 mark



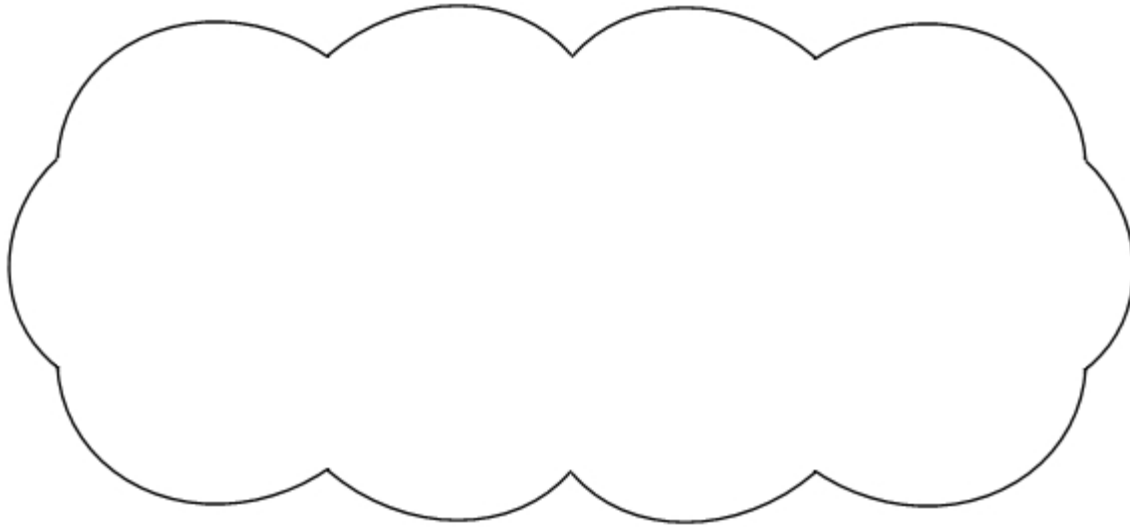
23.

Jamie draws a triangle.

He says,

***'Two of the three angles in my triangle are obtuse.'***

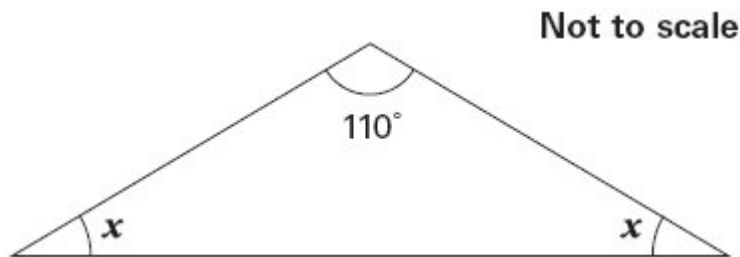
Explain why Jamie **cannot** be correct.



1 mark

24.

Here is an isosceles triangle.



Calculate the size of angle  $x$ .

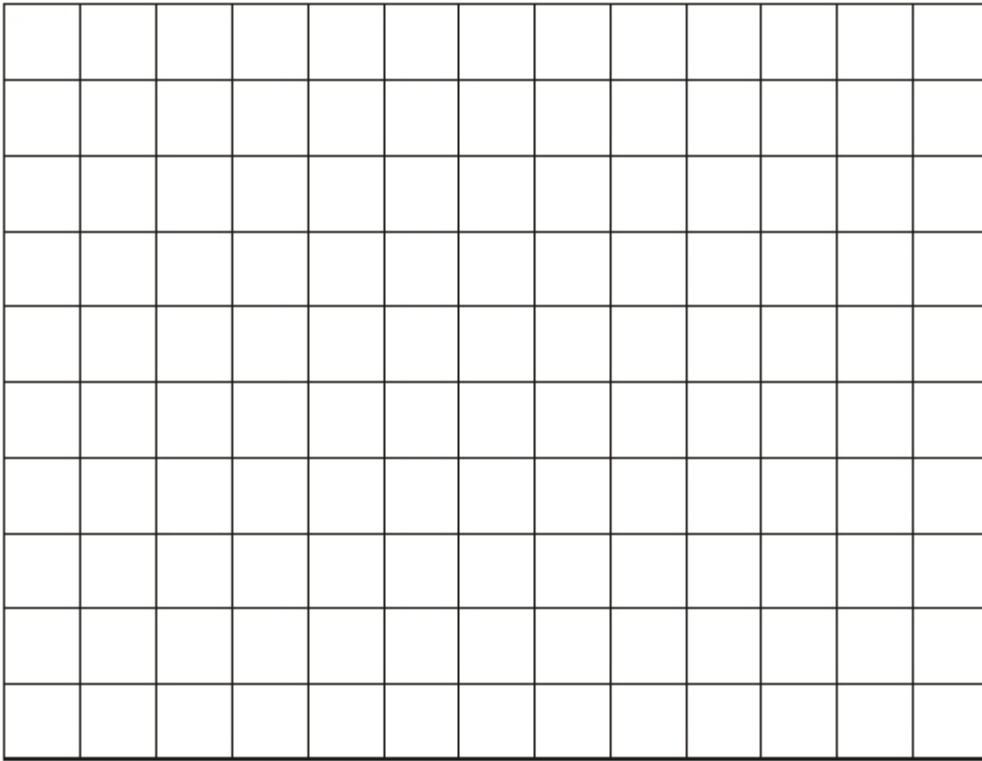
Do **not** use a protractor (angle measurer).



1 mark

**25.**

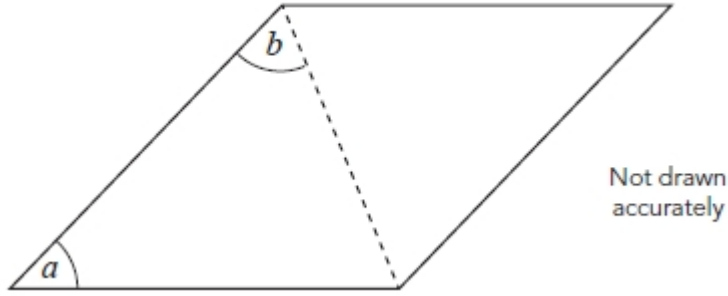
On the grid below, use a ruler to draw a **pentagon** that has **three right angles**.



1 mark

26.

The dotted line is a diagonal of this **rhombus**.

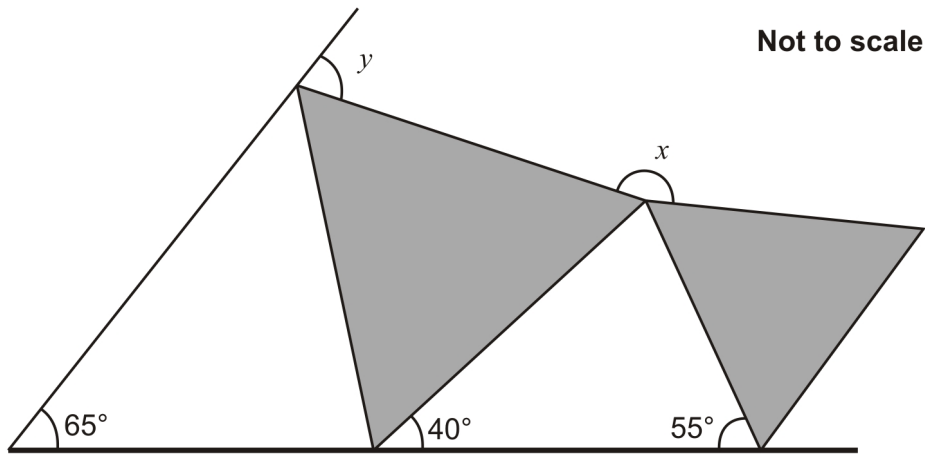


Show your method	If angle $a = 80^\circ$ , what is angle $b$ ?	
		<input type="text"/>
	If angle $b = 80^\circ$ , what is angle $a$ ?	
		<input type="text"/>

3 marks

27.

The diagram shows two shaded **equilateral triangles**.



Calculate the size of the **angle  $x^\circ$**  and **angle  $y$**

Do **not** use a protractor (angle measurer).

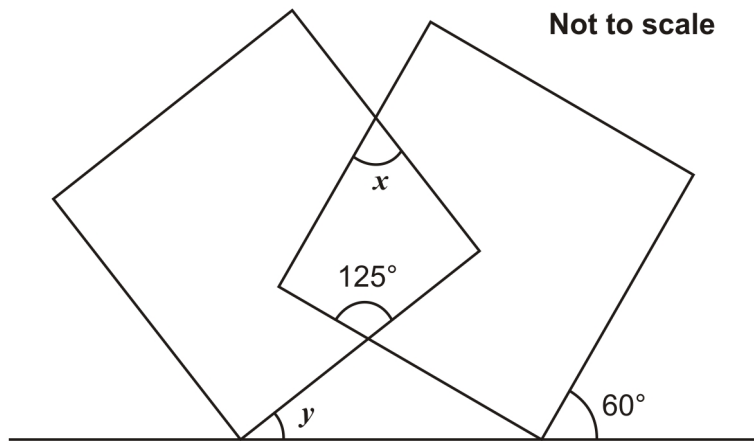
$x =$	°
-------	---

$y =$	°
-------	---

2 mark

28.

The diagram shows two overlapping squares and a straight line.



Calculate the value of **angle  $x$**  and the value of **angle  $y$** .

Do **not** use a protractor (angle measurer).

$$x =$$

1 mark

$$y =$$

1 mark

## Mark schemes

1.

- (a) *c AND e*

*Letters may be given in either order.*

1

- (b) *a AND d*

*Letters may be given in either order.*

1

[2]

2.

- (a) Answer is teacher's measurement  $\pm 2$  mm.

1

- (b) Answer in the range  $143^\circ$  to  $147^\circ$  **inclusive**.

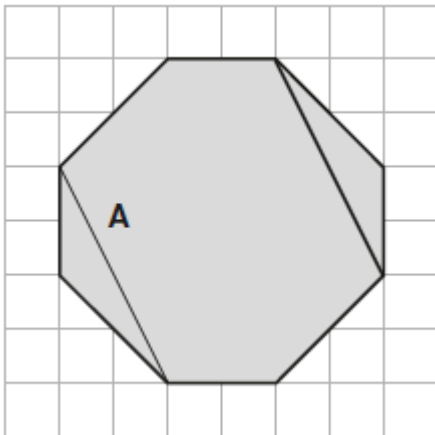
**Commentary:** Some measures questions specify the unit to be used. Where the unit is given in the question lozenge and in the answer box, it must be used. If pupils express their answers using a different unit, e.g. as 57 mm in the first part of this question, the mark will not be awarded.

1

[2]

3.

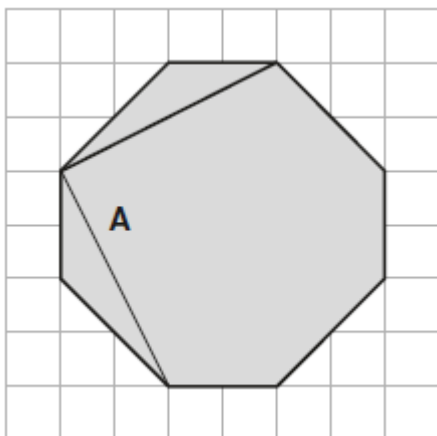
- (a) Line drawn parallel to A, as shown:



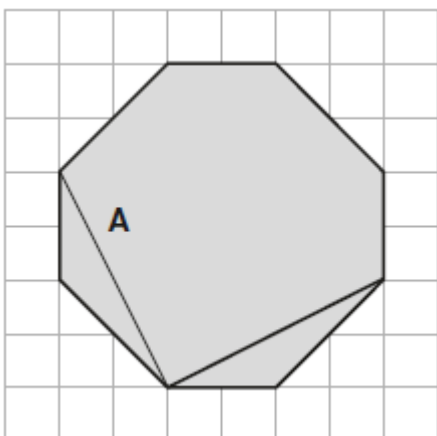
*Accept slight inaccuracies in drawing, provided the intention is clear.*

1

(b) Line drawn perpendicular to A, as shown:



OR



*Accept slight inaccuracies in drawing, provided the intention is clear.*

1

[2]

4.

2 AND 4

*Accept alternative unambiguous indications, eg right angles marked on diagrams.*

[1]

5.

(a) A AND B AND D

*Letters may be given in any order.*

1

(b) A AND C

*Letters may be given in any order.*

1

[2]

6.

(a) C AND D

*Letters may be given in either order.*

1

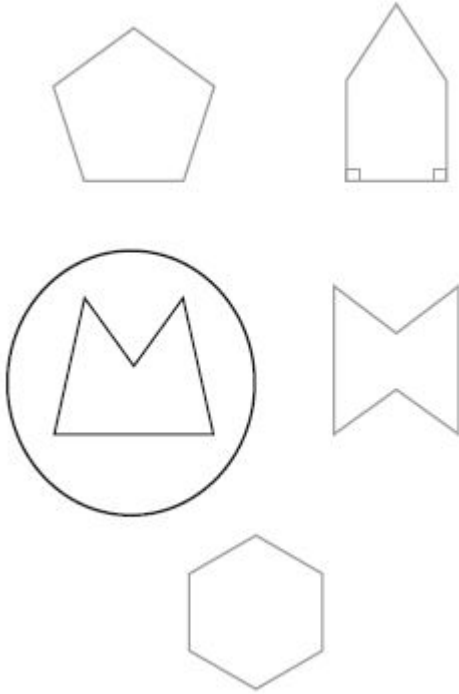
(b) A **AND** D

*Letters may be given in either order.*

1

[2]

**7.** The correct shape circled as shown:



*Accept alternative unambiguous positive indications, e.g. shape ticked.*

[1]

**8.** Award **TWO** marks for all three letters in the correct order as shown:

F

E

B

If the answer is incorrect, award **ONE** mark for two of the three letters correct.

Up to 2

[2]

**9.** 117°

[1]



10.

An explanation showing an understanding:

- that this specific triangle has angles 70, 70 and 40

OR

- of the properties of an equilateral triangle – all angles are equal ( $60^\circ$ )

and therefore that this triangle cannot be equilateral, e.g.

- The angles aren't  $60^\circ$
- There is not a  $60^\circ$  angle
- It has two different angles ( $70^\circ$  and  $40^\circ$ ) so it can't be equilateral
- The angles aren't the same
- An equilateral triangle has  $60^\circ + 60^\circ + 60^\circ$
- All the angles are the same in an equilateral triangle
- It's an isosceles triangle.

(In the context of this question, the term isosceles triangle is treated as not including equilateral triangles as a special type, as the national curriculum does not specify this at key stage 2.)

**Do not accept vague or incomplete explanations, e.g.**

- *The other angle is  $70^\circ$*
- *They aren't (all) the same. (No reference to angles)*
- *An equilateral triangle has equal angles. (Does not say all.)*

**Do not accept explanations which include incorrect mathematics or incorrect information that is relevant to the explanation, e.g.**

- $40 + 70 = 110 + 70 = 180$

[1]

11.

(a) 56

1

(b) 34

*If the answers to (a) and (b) are incorrect, award **ONE** mark if their (a) plus their (b) =  $90^\circ$ , provided that (b) is **not**  $45^\circ$ ,  $30^\circ$  or  $60^\circ$ .*

1

[2]

12.

Award **TWO** marks for all four boxes ticked or crossed correctly as shown:



If the answer is incorrect, award **ONE** mark for three boxes ticked or crossed correctly.

Accept alternative unambiguous indications eg **Y** or **N**.

For **TWO** marks accept:

✓
✓


Up to 2m

[2]

13.

Indicates No and gives a correct explanation

eg

- The angles are not the same size
- A regular pentagon looks like this,  with its angles all the same size
- All the angles should be  $108^\circ$
- It doesn't have rotation symmetry
- It's got more sides than a square so all its angles should be obtuse, but they're not

1

$60^\circ$

2

Shows that the  $150^\circ$  angle can be split into  $90^\circ$  and  $60^\circ$

**or**

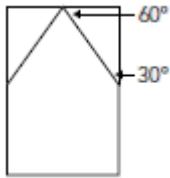
Divides the pentagon vertically and shows that half  $a$  is  $30^\circ$

or

Draws triangles to show a rectangle, labelling the non-right angles on at least one side correctly

eg

•



or

Shows or implies that the angle sum of a pentagon is  $540^\circ$

1

*Accept minimally acceptable explanation*

eg

- $90 \neq 150$
- *Different angles*
- *A regular pentagon doesn't have right angles in it*
- *A regular one can't have  $150^\circ$  angles*
- *It doesn't look the same when it's turned*
- *Not all the angles are obtuse*

*! Incorrect angle size for a regular pentagon given*

*Condone alongside a correct response*

*eg, accept*

- *The angles are different, they should be  $60^\circ$  (error, but all equal implied)*
- *The angles should all be  $70^\circ$  (error)*

*eg, do not accept*

- *The  $90^\circ$  angles should be  $60^\circ$  (does not imply the angles should all be the same)*

**Do not accept** incomplete explanation

eg

- *Not the same*
- *It has two right angles*
- *Two angles are the same*

- *A regular pentagon looks like this*



- *A regular pentagon doesn't have any vertical lines*

*! Indicates Yes, or no decision made, but explanation clearly correct*

*Condone provided the explanation is more than minimal*

[3]

14.

$270^\circ$

[1]

15.

90°

1

270°

1

[2]

16.

Letters written in order as shown

*d, e, a, b, c*

[1]

17.

190° indicated

[1]

18.

(a) 160

1

(b) 20

*If the answers to a and b are incorrect, award **ONE** mark if  $a + b = 180^\circ$  unless  $b$  is between  $33^\circ$  and  $37^\circ$  inclusive, or  $90^\circ$ .*

1

[2]

19.

Completes all four rows of the table correctly, eg:

90°	45°	45°
80°	90°	10°
70°	70°	40°
70°	55°	55°

*Accept angles within a row in either order*

*Accept the bottom two rows may be given in either order*

*! Condone omission of degree signs*

*! For 2 marks, do not accept correct angles in 3<sup>d</sup> row repeated in 4<sup>th</sup> row, in either order*

2

**or**

Completes three rows correctly

1

[2]

**20.**

Award **TWO** marks for correct answer of 170°

Up to 2

If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, eg:

- $50 + 50 + 90 = 190$

$$360 - 190$$

**OR**

- $360 - 50 - 50 - 90$

*Answer need not be obtained for the award of **ONE** mark.*

Up to 2

[2]

**21.**

17

*! Answer written on diagram*

*Accept providing there is no ambiguity*

2

**or**

73° seen (*one of the other angles in the isosceles triangle*)

**OR**

Shows or implies a complete correct method, eg:

- $180 - 34 = 144$  (*error*)

$$144 \div 2 = 72$$

$$90 - 72 = 28$$
 (*error*)

1

[2]

**22.**

25

[1]

23.

An explanation (or diagram) which recognises that the sum of two obtuse angles would be greater than 180 degrees, eg:

- 'An obtuse angle is greater than 90 degrees and the angles of a triangle add up to 180 degrees'
- 'Two obtuse angles add up to more than 180'
- '180 degrees is less than two obtuse angles'
- 'It must have at least two acute angles'
- 'The shape would need more than 3 sides to join up'



**Do not** accept answers that refer only to the properties of obtuse angles **OR** to the angles of a triangle, eg:

- 'The angles of a triangle add up to 180 degrees'
- 'Obtuse angles are greater than 90 degrees'.

**Do not** accept vague or incomplete explanations, eg:

- 'A triangle cannot have two obtuse angles'
- 'Obtuse angles would be too big'
- 'You can only have acute angles'.

U1

[1]

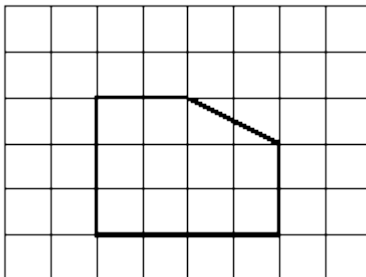
24.

$x = 35^\circ$

[1]

25.

Any pentagon which has three right angles, eg



The shape need not follow grid lines. Allow slight inaccuracies in drawing, provided the intention is clear

[1]

26.

$b = 50$

1

$a = 20$

1  
U1

As evidence of a correct method, in either part, shows or implies that the angles in one of the triangles are  $a$ ,  $b$  and  $b$

eg, in the first question part

- 80, 50, 50 seen
- $(180 - 80) \div 2$
- $(360 - 160) \div 2 \div 2$

eg, in the second question part

- $180 - 2 \times 80$
- $(360 - 160 \times 2) \div 2$

eg, correct answers transposed

*! Incomplete or no working shown*

*Provided at least one correct angle is credited, award this mark*

*! In the second question part 80, 80, 20 is insufficient without any indication of the position of the equal angles*

1

[3]

27.

(a)  $x = 155^\circ$

1

(b)  $y = 85^\circ$

*If answers for 5a and 5b are transposed, but otherwise correct, award **ONE** mark only, in the 5b box.*

1

[2]

28.

(a)  $55^\circ$

*If answers for 9a and 9b are transposed, but otherwise correct, award the mark for 9b only*

1

(b)  $25^\circ$

1

[2]